#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

### DIVISION OF HIGHWAYS

## GEOTECHNICAL UNIT

# ID STATE PROJECT NO. SHEET NO. TOTAL SHEETS B-3256 8.2405601 2 2I

### SUBSURFACE INVESTIGATION

### AND BOCK LEGEND TERMS SYMBOLS AND ABBREVIATIONS

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS			
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER 30 cm. ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM 0-1596), SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTIMENT FACTORS SUCH AS MINERALOGICAL	WELL GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE (ALSO POORLY GRADED).  GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.  ANGULARITY OF GRAINS	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL, IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 2.5 cm PER 50 BLOWS, IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.  ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLOWS:	ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. <u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA. <u>ARENACEOUS</u> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <u>ARGILLACEOUS</u> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE
COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:  VERY STAFF, GRAY SULY CUR, MOST WITH INTERSECUCE FINE SAMO LINERS, ARONY PLASTIC, A-7-6  SOIL LEGEND AND AASHTO CLASSIFICATION	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.  MINERALOGICAL COMPOSITION	WEATHERED ROCK (WR)  NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER 30 cm.	PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.  ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GENERAL   GRANULAR MATERIALS   SILT-CLAY MATERIALS   CLASS. (.35% PASSING *200)   CRGANIC MATERIALS   CROUP   A-1   A-3   A-2   A-4   A-5   A-6   A-7   A-1, A-2   A-4, A-5	MINERAL NAMES SUCH AS QUARTZ, FELOSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.  COMPRESSIBILITY	NON-CRYSTALLINE WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE, GAELSS, CARBAN, SCHIST, EFT.  NON-CRYSTALLINE FIRE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN.	CALCAREOUS (CALC.) - 60ILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
CLASS. A-1-6 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	ROCK (NCR)    INCLIDES PHYLLITE, SLATE, SANDSTONE, ETC.   COASTAL PLAIN   COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
7. PASSING   SILT-   GRANULAR   SILT-   CLAY   SOILS   SILT-   CLAY   SOILS	PERCENTAGE OF MATERIAL           ORGANIC MATERIAL         GRANULAR SOILS         SILT- CLAY SOILS         OTHER MATERIAL           TRACE OF ORGANIC MATTER         2 - 3%         3 - 5%         TRACE         1 - 10%           LITTLE ORGANIC MATTER         3 - 5%         5 - 12%         LITTLE         10 - 20%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  DIP DIRECTION OIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP,  MEASURED CLOCKWISE FROM NORTH,  FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES
LIDUID LUMIT	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE GROUND WATER	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V. SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.  SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIA
USUAL TYPES STOKE FRAGS. OF MAJOR MATERIALS SAND SAND GRAVEL AND SAND SOILS GRAVEL AND SAND SOILS GRAVEL AND SAND GRAVEL AND SAND SOILS GRAVEL AND SAND THE PROPERTY OF THE PR	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.  ▼ STATIC WATER LEVEL AFTER 24 HOURS.	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 2.5 cm. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITIOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.  MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERINE EFFECTS. IN 1000.00 GRANITIOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
AS A   EXCELLENT TO GOOD   FAIR TO POOR   PAIR TO POOR   UNSUITABLE	PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA  OMM SPRING OR SEEPAGE  MISCELLANEOUS SYMBOLS	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.  MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
CONSISTENCY OR DENSENESS  PRIMARY SOIL TYPE  COMPACTNESS OR CONSISTENCY  COMPACTNESS OR CONSISTENCY  COMPACTNESS OR COMPACTNES	ROADWAY EMBANKMENT  WITH SOIL DESCRIPTION  SPT CPT DET ONT TEST BORING SAMPLE DESIGNATIONS	MOD. SEV.)  AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.  IF TESTED, MOULD YIELD SPT REFUSAL.  SEVERE  ALL ROCKS EXCEPT OWARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	MOTTLED (MOTL) - IRREGULARLY MARKED MITH SPOTS OF DIFFERENT COLORS.MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY LOOSE	SOIL SYMBOL  AUGER BORING  S- BULK SAMPLE  ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS  CORE BORING  ST- SHELBY TUBE  ST- SHELBY TUBE  ST- SHELBY TUBE  ST- SHELBY TUBE	IN STREMOTH TO STROMG SOIL. IN GRANTTOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STROMG ROCK USUALLY REMAIN.    F. TESTED, YIELDS SPT. N. YALLES > 100 BLOWS PER 30 cm.   VERY SEVERE   ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, MITH ONLY FRAMENTS OF STROMG ROCK REMAININ SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF TH	
VERY SOFT C2 C25 GENERALLY SOFT 2 TO 4 25 TO 50 SILT-CLAY MEDIUM STIFF 4 TO 8 50 TO 100 MATERIAL STIFF 8 TO 15 100 TO 200 (COHESIVE) VERY STIFF 15 TO 30 200 TO 400	INFERRED ROCK LINE  PIEZOMETER  ALLUVIAL SOIL BOUNDARY  PIEZOMETER  RS- ROCK SAMPLE  INSTALLATION  RT- RECOMPACTED  TRIAXIAL SAMPLE	ORIGINAL ROCK FABRIC REMAIN. IE TESTED, YIELDS SPT. N. YALUES < 180 BLOWS PER 30 cm,  COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND  SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSIT OF THE INTRUDED ROCKS.
HARD   >30	ZEVECES DIP/OIP DIRECTION OF INSTALLATION CBR - CBR SAMPLE  SOUNDING ROD REF - SPT REFUSAL	ROCK HARDNESS  VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK,	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  SLIP PLANE.  STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg HAMMER FALLING 8.75 METERS REQUIRED TO PRODUCE A PENETRATION OF 38 cm. INTO SOIL WITH
OPENING (MM)         4.76         2.0         8.42         8.25         0.075         0.053           BOULDER         COBBLE         GRAVEL         COARSE CAND         FINE CAND         SILT         CLAY	ABBREVIATIONS  AR - AUGER REFUSAL PMT - PRESSUREMETER TEST	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.  MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 6 mm DEEP CAN BE	A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION WITH 50 BLOWS.  STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
(BLDR.)         (COB.)         (GR.)         (CSE. SD.)         (F. SD.)         (SL.)         (CL.)           GRAIN MM 305         75         2.0         0.25         0.05         0.005           SIZE IN. 12'         3'         0.25         0.005         0.005	BT - BORING TERMINATED SD SAND, SANDY CL CLAY SL SILT, SILTY CPT - CONE PENETRATION TEST SLI SLIGHTLY CSE COARSE TCR - TRICONE REFUSAL	HARD EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.  MEDIUM CAN BE GROOVED OR GOUGED I mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.  CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE	STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
SOIL MOISTURE - CORRELATION OF TERMS  SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION  GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST  DPT - DYNAMIC PENETRATION TEST  e - VOID RATIO  F FINE  TO SHAPE OF THE PROPERTY OF	POINT OF A GEOLOGISTS PICK.  SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.  BENCH MARK: SPIKE IN BASE OF POWER POLE * 140 @ BASELINE STATION  13+87.38, 4.877m LT
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE  PLASTIC PLASTIC CONTROL TO DEGUEES DRVING TO	FOSS FOSSILIFEROUS V VERY FRAC FRACTURED VST - VANE SHEAR TEST FRAGS FRAGMENTS MED MEDIUM	VERY  CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 25 mm  OF MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	ELEVATION: 132.627meters NOTES:
RANGE - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE  OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:  CLAY BITS  CLAY BITS  CLAY BITS  CLAY BITS	FRACTURE SPACING   BEDDING	-
SHRINKAGE LIMIT	MOBILE 8-	MODERATELY CLOSE 30 TO 100 cm	
PLASTICITY	CME-45	INDURATION  FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.  RUBBING WITH FINGER FREES NUMEROUS GRAINS;  GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
COLOR   Colo	PORTABLE HOIST TRICONE	MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.  INDURATED  GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	CORE BIT SOUNDING ROD  OTHER OTHER OTHER  OTHER OTHER	DIFFICULT TO BREAK WITH HAMMER.  EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;  SAMPLE BREAKS ACROSS GRAINS.	
			REVISED 09/15/00